

IN THE SUPREME COURT OF TENNESSEE  
AT NASHVILLE  
October 3, 2000 Session

**STATE OF TENNESSEE v. RANDALL SCOTT**

**Appeal by Permission from the Court of Criminal Appeals  
Criminal Court for Davidson County  
No. 96-C-1362 Hon. Cheryl Blackburn, Judge**

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**No. M1997-00088-SC-R11-CD - Filed December 11, 2000**

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The appellant in this case was arrested and charged with the rape and aggravated sexual battery of a nine-year-old child in Davidson County. Prior to trial, the State conducted various types of DNA analysis on several pieces of evidence, and the appellant, who is indigent, requested state-funded expert assistance in the field of DNA analysis to prepare his defense. The trial court denied the appellant's motion for expert assistance and declined to hold a hearing to establish the reliability of mitochondrial DNA analysis. The trial court also held that the State properly established the chain of custody for certain hairs removed from the victim during her physical examination. The appellant was found guilty by a jury on both charges, and the Court of Criminal Appeals affirmed the convictions and sentences. On appeal to this Court, we address the following issues: (1) whether the appellant was entitled to expert assistance in the field of DNA analysis under State v. Barnett, 909 S.W.2d 423 (Tenn. 1995) and Tennessee Supreme Court Rule 13; (2) whether the trial court erred in failing to hold a pre-trial hearing on the reliability of mitochondrial DNA analysis; and (3) whether the State's failure to establish a chain of custody as to certain hairs retrieved from the victim was error. For the reasons given herein, we hold that although the appellant was not entitled to a pre-trial hearing on the reliability of mitochondrial DNA analysis, he was entitled to receive expert assistance in the field of DNA analysis. We also hold that the State failed to properly establish the chain of custody of the hair samples. We reverse the appellant's convictions and sentences, and we remand this case to the Davidson County Criminal Court for a new trial on both counts of the indictment.

**Tenn. R. App. P. 11 Application for Permission to Appeal; Judgment of the Court of Criminal Appeals Affirmed in Part, Reversed in Part; Case Remanded for a New Trial**

WILLIAM M. BARKER, J., delivered the opinion of the court, in which E. RILEY ANDERSON, C.J., and FRANK F. DROWOTA, III, ADOLPHO A. BIRCH, JR., and JANICE M. HOLDER, JJ., joined.

Jeffrey A. DeVasher, Assistant Public Defender, Nashville, Tennessee—appellate counsel; J. Michael Engle, Assistant Public Defender, Nashville, Tennessee—trial counsel, for the appellant, Randall Scott.

Paul G. Summers, Attorney General and Reporter; Michael E. Moore, Solicitor General; Kim R. Helper, Assistant Attorney General, Nashville, Tennessee, for the appellee, State of Tennessee.

## OPINION

### *FACTUAL BACKGROUND*

During the early evening hours of April 17, 1995, nine-year-old L.F.<sup>1</sup> walked from her house in Nashville to a local drug store, which was located a few blocks away. Earlier that day, her father had given her some money, and L.F. decided to spend some of it purchasing a new pair of earrings. Soon after she entered the drugstore, L.F. noticed a man purchasing some beer at the counter. She noticed the man because she saw him earlier that day leaving a house located on the same street as her house. After a few moments, L.F. selected her earrings, paid for them at the counter, and then left the store to go home.

As she headed home, L.F. walked a short distance behind the man from the drugstore, and the two crossed the street together at an intersection a block from the drug store. Soon after crossing the street, L.F. became aware that the man was now walking closely behind her. Without warning, the man suddenly rushed up from behind her, grabbed her around her waist, and placed his hand over her mouth. The man then forced L.F. into an adjacent alley behind a shed, where he forced her to the muddy ground and removed her pants and underwear. The man then touched her vagina with his finger, and he anally raped her. Somehow, L.F. managed to escape, and she ran home to her father.

Once L.F. told her father what happened, he immediately called the Nashville police, who arrived about five or ten minutes later. Two officers later testified that when they arrived, L.F. was “covered in dirt” and had “dirt on her arms and on her clothing.” The officers also described L.F. as being quiet and scared, although she became very upset when the officers asked her to describe what happened. When initially questioned by one of the officers, L.F. was unable to give any details, but she was later able to describe her lone attacker as a black male wearing a red jersey and short pants. L.F. also showed the officers where the attack took place, and she directed the officers to the house from which she saw the man leave earlier that day. L.F. was unable, however, to identify the appellant as her attacker in a lineup conducted eight days later.

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<sup>1</sup> It is the policy of this Court not to identify by name the minor victims of sexual abuse. Therefore, we refer to the minor victim in this case only by her initials.

Two of the officers then went to the house described by L.F., where they discovered the appellant in the kitchen. The appellant, who was renting a room in the house, consented to having the officers search his bedroom. Upon entering the appellant's bedroom, the officers found a red sweatshirt with short, gray sleeves lying on the bed, along with a pair of muddy blue jean shorts on the floor. The owner of the house told the police that the appellant was wearing the sweatshirt and shorts earlier in the evening, although he later changed clothes.

When initially questioned by the police, the appellant claimed that he had been home all evening, but upon further questioning, he admitted that he went to the drugstore to buy a pack of cigarettes and some beer. The appellant, who also originally claimed to be wearing a black t-shirt and pants when he went to buy cigarettes and beer, later admitted to wearing the red sweatshirt and blue jean shorts to the drugstore. The appellant could not say how his clothes became muddied.

Meanwhile, L.F. was taken to General Hospital in Nashville for examination. The nurse practitioner later testified that the examination of L.F. revealed "an area of increased redness, just outside the vaginal opening," as well as "a tear in her rectal area." The nurse practitioner also removed and collected "more than one" foreign hairs from L.F.'s inner thigh and genital area. L.F. was then sent to Vanderbilt Hospital to undergo more extensive examination while under anesthesia. This examination revealed one significant tear in the rectum accompanied by four smaller tears in the same area. According to the nurse practitioner, these tears probably occurred within twenty-four hours of the examination and were consistent with anal penetration.

Along with blood samples taken from the appellant and L.F., the police sent L.F.'s rape kit and the appellant's clothing to the Tennessee Bureau of Investigation (TBI) for DNA analysis. Forensic scientists with the TBI found blood on the appellant's clothing, but they were unable to conduct any analysis on the sample using Restriction Fragment Length Polymorphism (RFLP) DNA analysis due to its insufficient amount. The TBI did not conduct any DNA analysis on the hairs contained in the rape kit. All of these items were later sent for further DNA analysis to Laboratory Corporation of America (LabCorp), a North Carolina corporation specializing in DNA testing.

Forensic scientists at LabCorp conducted polymerase chain reaction (PCR) DNA analysis on the blood found on the appellant's shorts and concluded that the DNA found in this blood sample was consistent with that of the victim. The blood found on the appellant's sweatshirt was also consistent with L.F.'s DNA profile. Interestingly, however, PCR DNA testing of two of the hairs removed from L.F. revealed a profile consistent with her alone, and LabCorp excluded the appellant as a possible source of the hair. Moreover, a scientist from LabCorp later testified that she found samples of blood from an unidentified third person on the appellant's shorts. When questioned about this anomaly at trial, the scientist testified that the samples could have been contaminated.

The evidence was later sent to the Federal Bureau of Investigation for a third type of DNA analysis, mitochondrial DNA (mtDNA) analysis. Through this method of testing, the FBI concluded that one of the hairs taken from L.F. had the same DNA sequence as that found in the appellant's blood sample. Further, because this particular mtDNA sequence had not been previously observed

in the general population, the FBI agent concluded that the appellant was the probable donor of the hair removed from the victim.

### *PROCEDURAL BACKGROUND*

In July of 1996, the appellant was indicted with one count of rape of a child and one count of aggravated sexual battery. Three months later, counsel for the appellant filed a motion before the Davidson County Criminal Court requesting expenses for expert assistance on the PCR and mtDNA methods of DNA analysis. The trial court held a hearing on the motion, during which two experts in criminal trial practice testified that expert assistance was crucial to conducting a defense in cases where DNA analysis comprised a significant portion of the state's evidence. The first witness, Mr. Ashoke Bappa Mukherji, testified that he had clinical and trial experience with DNA analysis and that he believed expert assistance to be "absolutely critical" in educating defense counsel as to the techniques, uses, and weaknesses that may exist in any particular case involving DNA. Mr. Mukherji also testified that despite having had personal experience in conducting RFLP analysis, he could not "effectively represent a client in challenging the results of the DNA tests" without outside expert assistance.

Mr. David Raybin testified that the need for expert assistance in DNA analysis was much different from expert assistance in other areas of trial. Mr. Raybin stated that while "[e]xpert assistance is frequently a luxury," there are some cases in which the expert assistance "is absolutely critical to the point where [one] cannot competently and completely defend the person because the expert testimony is necessary. It is critical to defending an individual on the charge of a particular crime." Mr. Raybin went so far as to say that he would not consider representing the appellant in this case if expert assistance were not made available to help understand the State's test results and to "develop[] an expertise capable to cross-examine a witness." "That is how critical it is," he testified.

On December 30, 1996, the trial court denied the appellant's motion for funds to secure expert assistance with respect to the PCR or mtDNA methods of DNA analysis. In a written order, the trial court gave three reasons for the denial: (1) that no due process violation had been shown because some non-indigent defendants could not afford expert assistance;<sup>2</sup> (2) that the appellant's counsel had not demonstrated a "particularized need" for the expert assistance as evidenced by his in-depth knowledge and research into the issues; and (3) that because the cost of employing expert assistance in this case could easily exceed \$10,000, the fiscal burden on the state outweighed any risk of misidentification. The trial court also required that the State's experts "be made available to

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<sup>2</sup> According to the trial court, this fact established that the appellant was not being denied expert help solely because of his indigency. During the hearing on the motion, Mr. Raybin admitted that even some non-indigent defendants are unable to afford expert assistance in DNA analysis. He characterized this situation as a "twilight" position between being able to afford both counsel and expert assistance and not being able to afford either counsel or expert assistance. He noted that in some cases, courts have found a defendant to be indigent with respect to a particular issue, *i.e.*, payment of trial transcripts for appeal, even though the defendant was financially able to afford competent counsel.

defense counsel for in-depth interviews about their test data, interpretations, and protocols without the presence of counsel for the State.”

The appellant also filed a separate motion in limine requesting a hearing on the evidentiary admissibility of mtDNA analysis. The appellant argued that because the technology used in this type of analysis amounted to novel scientific evidence, the trial court could not admit evidence of mtDNA without adequate assurance that this type of evidence was sufficiently trustworthy and reliable. In response, the State argued that Tennessee Code Annotated section 24-7-117 “is applicable to all types of DNA testing and the court is not required to conduct a pre-trial hearing concerning the admissibility of the same.” The trial court agreed with the State, and it denied the appellant’s motion.

Thereafter, the appellant was tried before a jury on both counts of the indictment. The appellant did not contest the fact that a crime had been committed or that he had the theoretical opportunity to commit the crime. The appellant’s sole defense was that he was not the perpetrator of the crime, thereby placing the identity of the offender squarely at issue. After hearing several days of testimony, however, the jury returned a guilty verdict on each count as charged in the indictment on April 23, 1997. On June 4, 1997, the appellant was sentenced as a Range I standard offender to serve twenty-five years for his conviction for rape of a child and to serve ten years for his conviction for aggravated sexual battery. The trial court then ordered that these two sentences be served consecutively in the Department of Correction for an aggregate sentence of thirty-five years.

On appeal to the Court of Criminal Appeals, the appellant argued, among other things, that the trial court committed three important errors: denying his motion for expert assistance in the field of DNA analysis, failing to hold a hearing on the admissibility of mtDNA, and finding that the State properly established the chain of custody for the hair samples removed from L.F. The intermediate court affirmed the appellant’s convictions and sentences. The court found that the appellant was not entitled to expert assistance because no “particularized need” for the assistance had been shown. More specifically, the court noted that the lack of “particularized need” was shown by the fact that (1) counsel “ably cross-examined the state’s expert witnesses and communicated the weaknesses in the DNA evidence to the jury”; and (2) the DNA evidence “was not crucial to the state’s case.” The court also held that the appellant was not entitled to a pre-trial hearing on the reliability of mtDNA evidence based upon Tennessee Code Annotated section 24-7-117 and this Court’s decision in State v. Begley, 956 S.W.2d 471 (Tenn. 1997). Finally, the Court of Criminal Appeals held that while the State failed to properly establish the chain of custody for the hair samples, any such error was harmless.

The appellant then requested, and we granted, permission to appeal on the following three issues: (1) whether the appellant was entitled to expert assistance in the field of DNA analysis under State v. Barnett, 909 S.W.2d 423 (Tenn. 1995) and Tennessee Supreme Court Rule 13; (2) whether the trial court erred in failing to hold a pre-trial hearing to establish the reliability of mtDNA analysis; and (3) whether the State’s failure to establish a chain of custody as to certain hairs retrieved from the victim was error. For the reasons given herein, we hold that although the

appellant was not entitled to a pre-trial hearing on the reliability of mtDNA analysis, he was entitled to receive expert assistance in the field of DNA analysis. We also hold that the State failed to properly establish the chain of custody for the hair samples taken from the victim. We reverse the appellant's convictions and sentences, and we remand this case to the Davidson County Criminal Court for a new trial on both counts of the indictment.

### **STANDARD OF APPELLATE REVIEW**

Although we are presented with three separate issues in this case, all of these issues are reviewed under an abuse of discretion standard of appellate review. See State v. Barnett, 909 S.W.2d 423, 431 (Tenn. 1995) (reviewing trial court's denial of defendant's request for appointment of a psychiatric expert for an abuse of discretion); State v. Begley, 956 S.W.2d 471, 472 n.1 (Tenn. 1997) (reviewing admission of DNA evidence for an abuse of discretion); State v. Holbrooks, 983 S.W.2d 697, 701 (Tenn. Crim. App. 1998) (reviewing chain of custody issues under an abuse of discretion standard). While "a trial court's ruling [under this standard] will be upheld so long as reasonable minds can disagree as to propriety of the decision made," see State v. Gilliland, 22 S.W.3d 266, 270 (Tenn. 2000), we will nevertheless reverse the decision if "the court applied an incorrect legal standard, or reached a decision which is against logic or reasoning that caused an injustice to the party complaining," State v. Shirley, 6 S.W.3d 243, 247 (Tenn. 1999).

### **EXPERT ASSISTANCE IN THE FIELD OF DNA ANALYSIS**

The first issue we address in this case is whether the appellant, as an indigent defendant charged with a non-capital offense, was entitled to have state-funded expert assistance in the field of DNA analysis. Although the legislature has yet to specifically authorize expert assistance for indigent defendants charged with non-capital offenses, the current version of section 7 of Supreme Court Rule 13 provides for the payment of expert assistance "[i]n the trial and direct appeals of *all* criminal cases in which the defendant is entitled to appointed counsel . . . [when such services] are necessary to ensure that the constitutional rights of the defendant are properly protected." (emphasis added). As the language of Rule 13 indicates, the intention of this Court is to ensure that no defendant is denied the protection of his or her constitutional rights solely because of indigency. As such, the language of Rule 13 serves to emphasize that the need for expert assistance is not limited to capital cases and that the expert assistance sought by a defendant need not be limited to a particular field of expertise, so long as the assistance is necessary to protect the defendant's constitutional rights.

Although the current language of Rule 13 was not in place at the time of the trial court's denial of expert assistance in this case, the trial court was certainly not without authority to allow the appellant the benefit of expert assistance upon a showing of necessity. In State v. Barnett, 909 S.W.2d 423 (Tenn. 1995), this Court held that due process of law principles required the appointment of expert assistance in a non-capital case when the defendant is able to show that such assistance is necessary to conduct a constitutionally adequate defense. At least since our decision in Barnett, from which the current language of Rule 13 is derived, this Court has been clear that

“[w]hile a State need not provide an indigent defendant with all the assistance his wealthier counterpart might buy . . . fundamental fairness requires a State to provide an indigent defendant with the ‘basic tools of an adequate defense or appeal.’” Barnett, 909 S.W.2d at 426 (quoting Ake v. Oklahoma, 470 U.S. 68, 77 (1985)). Although the actual holding of Barnett was concerned with appointment of psychiatric assistance, our reliance on “the due process principle of fundamental fairness” to reach this conclusion was a clear signal that types of assistance other than psychiatric assistance should be provided upon a showing of necessity.<sup>3</sup>

#### PARTICULARIZED NEED FOR EXPERT ASSISTANCE

Of course, to say that the trial court had the *authority* to appoint expert assistance is not to say that the trial court in this case had the *obligation* to do so. The obligation of a court to afford an indigent defendant the benefit of expert assistance does not arise unless the defendant makes a threshold showing of a “particularized need” for the expert assistance. See Barnett, 909 S.W.2d at 430-31. In Barnett, we stated that before the right to assistance of state-funded experts arises, “[t]he defendant must show that a substantial need exists *requiring* the assistance of state paid supporting services and that his defense cannot be fully developed without such professional assistance.” Id. at 430 (emphasis in original). To this end, we adopted the following two-pronged test to determine whether the defendant has made the threshold showing of “particularized need”: (1) the defendant must show that he or she “will be deprived of a fair trial without the expert assistance”; and (2) the defendant must show that “there is a reasonable likelihood that [the assistance] will materially assist [him or her] in the preparation of [the] case.” Id. In making this threshold showing, however, we cautioned defendants that

[u]nsupported assertions that [an] expert is necessary to counter the State’s proof are not sufficient. The defendant must demonstrate by reference to the facts and circumstances of [the] particular case that appointment of a psychiatric expert is necessary to insure a fair trial. Whether or not a defendant has made the threshold showing is to be determined on a case-by-case basis, and in determining whether a particularized need has been established, a trial court should consider all facts and circumstances known to it at the time the motion for expert assistance is made.

Id. at 431.

Based on our review of the record in this case, we first conclude that the appellant demonstrated a particularized need for expert assistance in the field of DNA evidence at the time of

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<sup>3</sup> The trial court ruled in part that because some non-indigent defendants could not afford expert assistance in DNA analysis, the appellant in this case was not being deprived of needed expert services because of his indigency. With all due respect, we could not disagree more with this analysis. The test to be applied is whether *this* defendant is indigent and has made a showing of a “particularized need” for the expert assistance. When a defendant can make this threshold showing, a trial court’s denial of expert assistance is clearly a denial of due process of law, irrespective of the financial circumstances and choices of other defendants. To be clear, the focus of the inquiry must remain upon affording the particular indigent defendant with “the basic tools of an adequate defense” as required by the Due Process Clause.

his request. Far from justifying the request with “unsupported assertions,” the appellant’s counsel listed in meticulous detail the reasons needed for the expert assistance. For instance, the appellant’s counsel stated that expert assistance was needed to establish a familiarity with proper DNA protocols and to point to relevant issues and lines of cross-examination. In support of these assertions, counsel offered expert testimony from witnesses who stated that expert assistance in this area was absolutely crucial to competent representation given that the subject matter was inordinately complex and beyond the common understanding of most attorneys.<sup>4</sup> One of the appellant’s experts further opined that it was doubtful that the appellant’s attorney could even know the relevant issues involved in DNA analysis without some type of expert assistance.

Beyond general assertions of need, however, the appellant also established that because the DNA examinations from the FBI and LabCorp reached inconsistent results regarding the donor of the hair samples, expert assistance was especially needed to help determine whether the samples were contaminated and why the appellant was apparently excluded as a donor in one test involving PCR analysis. Finally, counsel demonstrated that he needed expert assistance to understand why some reports mentioned that the samples of blood from the appellant’s clothing contained the DNA of an unidentified third person.

As required by Barnett, counsel sought to give the trial court precise reasons and detailed explanations for the need for expert assistance. Cf. State v. Edwards, 868 S.W.2d 682, 698 (Tenn. Crim. App. 1993) (denying expert assistance when “[t]he stated desire for ‘assist[ance] in his defense’ or for ‘inform[ation] regarding the DNA evidence the state would seek to introduce’ was too general in nature”). He detailed his efforts to become proficient in this area, he specified his efforts to locate in-state experts, and he listed the particular reasons for needing assistance despite these efforts. As such, we conclude that the appellant has shown that expert assistance was needed to ensure a fair trial. By denying the appellant expert assistance as to this type of evidence, the trial court deprived the appellant of a meaningful opportunity to defend when his liberty was at stake. Cf. Barnett, 909 S.W.2d at 428.

Second, we also conclude that the appellant has shown a reasonable likelihood that the expert assistance would be of material help in the preparation of his case. Because the identity of the offender was the only real issue at trial and because the jury’s conclusion as to the weight of the DNA evidence may have been conclusive as to its determination of the appellant’s guilt, expert assistance in DNA analysis may have been crucial to a successful defense. Indeed, it was only with the DNA evidence that the State was able to move its case beyond one of mere circumstantial evidence of guilt to one establishing a substantial and definite connection between the appellant and L.F. While some of the DNA tests appear to be exculpatory, there is no mistaking the importance

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<sup>4</sup> The complexity of the various DNA tests and results involved in this case is further illustrated by the language of the State’s motion requesting a continuation of the hearing on the appellant’s motion in limine: “Because of the inordinate complexity with respect to this scientific evidence, the State is requesting a continuance of this matter in order to prepare an adequate response for this anticipated Motion in Limine.” Given the fact that even the prosecutors, who presumably had DNA experts available, had trouble preparing responses to pre-trial motions, it seems incongruous to then conclude that the appellant lacked a “particularized need” for expert assistance to prepare for a full trial.

this evidence generally to the State's case.<sup>5</sup> For these reasons, we find that counsel for the appellant has made a showing that "there is a reasonable likelihood that [the assistance] will materially assist him in the preparation of his case." Accordingly, we hold that the trial court erred in denying the appellant expert assistance in the field of DNA analysis.

#### *HARMLESS ERROR ANALYSIS*

Although we have concluded that the trial court committed error in not providing the appellant with a state-funded expert in the field of DNA analysis, we must nevertheless examine whether this error was harmless. In Barnett, we stated that the right of an indigent defendant to receive state-funded expert assistance upon a showing of particularized need was grounded in fundamental principles of due process of law. 909 S.W.2d at 428. Indeed, we said that "[i]t is axiomatic that fairness cannot exist where an indigent defendant is deprived by poverty of a meaningful opportunity to defend when [his or her] liberty is at stake." Id. Accordingly, because a failure to provide an indigent defendant with needed expert assistance amounts to a denial of due process of law, we must use the constitutional harmless error standard: whether the error complained of was harmless beyond a reasonable doubt. See Momon v. State, 18 S.W.3d 152, 164, 167 (Tenn. 2000).<sup>6</sup>

After reviewing the record in this case, we are unable to conclude beyond a reasonable doubt that the improper denial of expert assistance had no appreciable effect upon the outcome of the trial. From our review of the record, we find that aside from the DNA evidence, the State did not have an overwhelming case of circumstantial evidence establishing the identity of the perpetrator. For example, while the victim identified the appellant at trial, she could not identify her attacker in a

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<sup>5</sup> Even the trial judge seemed to recognize the importance of the DNA analysis to the State's case, as she ordered the State to make its DNA experts available for defense questioning. Despite the trial judge's recognition of this fact, however, we conclude that her order did little to mitigate the effects of denying the appellant his own expert. The State's forensic witnesses, who actually conducted the DNA tests used at trial, had a significant interest in seeing that their test results were validated at trial and admitted into evidence. As such, these experts may have been of little practical help to a defendant seeking to expose any frailties in the DNA testing procedures or seeking to challenge the infirmities in the interpretations of those tests.

<sup>6</sup> With our decision in Momon, we made a distinction between those constitutional errors which are "trial errors" and those which are "structural defects." 18 S.W.3d at 165-66. Only those constitutional errors falling within the latter category defy harmless error analysis and require automatic reversal. Because we do not view denial of needed expert assistance to impact the "entire conduct of the trial from beginning to end," we conclude that the denial of this constitutional right is a trial error and properly subject to constitutional harmless error analysis. Cf. Fitzgerald v. State, 972 P.2d 1157, 1168 (Okla. Crim. App. 1998) (stating that "we agree with the Tenth and Eighth Circuits that, generally, 'a right to which a defendant is not entitled absent some threshold showing [cannot] fairly be defined as basic to the structure of a constitutional trial'"). But see Rev v. State, 897 S.W.2d 333, 345-46 (Tex. Crim. App. 1995) (holding denial of needed expert to be a structural defect, reasoning in part that the "[United States] Supreme Court in Ake reversed and remanded for a new trial without conducting a harm analysis").

lineup conducted about a week after the attack,<sup>7</sup> and she testified that when she saw her attacker on the night of the offense, she could not be sure what he looked like. While it is true that the appellant was found with muddy clothes matching the victim's description and that the victim showed officers the house from which she saw the appellant leave earlier in the day, these two facts alone can hardly be said to "unerringly point the finger of guilt to the [appellant] to the exclusion of all others beyond a reasonable doubt." Cf. Hicks v. State, 490 S.W.2d 174, 178 (Tenn. Crim. App. 1972).

Moreover, because the DNA evidence appears to have been the keystone of the State's case, an expert's assistance on the issues concerning the anomalous results of the various DNA tests could very well have made a difference in the preparation and presentation of the appellant's case or otherwise given rise to reasonable doubt in the minds of the jurors. It is especially noteworthy that the appellant's experts in criminal trial practice both testified that such expert assistance was "absolutely critical" to competent representation in this area given that the procedures and protocols for DNA testing are extremely complex. For all of these reasons, we hold that the trial court's failure to provide expert assistance to the appellant in the field of DNA analysis was not harmless beyond a reasonable doubt and that a new trial is required to ensure that the appellant is afforded due process of law.

### **PRETRIAL HEARING ON THE RELIABILITY OF MtDNA ANALYSIS**

The second issue we have been asked to address is whether the trial court erred in not holding a pretrial hearing to determine the general reliability of mtDNA analysis before allowing such evidence to be submitted to the jury. Quoting language from our decision in McDaniel v. CSX Transp. Inc., 955 S.W.2d 257, 265 (Tenn. 1997), the appellant argues that "the burden placed on trial courts to analyze and to screen novel scientific evidence is a significant one." He further argues that nothing in Tennessee Code Annotated section 24-7-117 relieves the burden on trial courts to independently determine the reliability of new DNA testing techniques. The State argues, on the other hand, that section 24-7-117 deems this type of DNA analysis to be "statutorily reliable" for purposes of evidentiary admission, and that as such, no McDaniel hearing to determine the reliability of the evidence was needed. We agree with the State and hold that the trial court properly admitted the evidence of mtDNA analysis without first holding a McDaniel hearing to establish the reliability of this method of proving identification.

#### *MtDNA ANALYSIS GENERALLY*

Before discussing the need for a McDaniel hearing in this case, it may be helpful to provide some general background concerning mtDNA analysis.<sup>8</sup> Generally speaking, every cell contains two

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<sup>7</sup> Although the victim identified the appellant at trial as the perpetrator, she admitted on cross-examination that she was unable to identify the appellant in the lineup because all of the persons in the lineup looked alike.

<sup>8</sup> The general background of mtDNA analysis discussed here was provided at trial by FBI Special Agent Mark Wilson. At the time of this trial, Agent Wilson was one of only two experts in the nation that had given testimony in a  
(continued...)

types of DNA material: nuclear DNA and mitochondrial DNA. Nuclear DNA material is found in the nucleus of the cell, and the analysis of nuclear DNA is the traditional form of DNA analysis with which most people are now commonly familiar. See State v. Begley, 956 S.W.2d 471, 473-74 (Tenn. 1997) (generally discussing nuclear DNA analysis). With analysis of an individual's nuclear DNA profile, the possibility exists that each individual, with the exception of identical twins, has a unique profile with respect to anyone else in the world.

By way of contrast, mtDNA comes from mitochondria in cells, and analysis of mtDNA provides significantly less ability to discriminate among possible donors. For example, because mtDNA is only inherited from the mother, all maternal relatives will share the same mtDNA profile. The final result in mtDNA typing analysis is that the defendant is either excluded as a possible contributor of the genetic material or he or she is included within the class of possible contributors.<sup>9</sup> Because it is not possible to achieve the extremely high level of exclusion provided by nuclear DNA, mtDNA typing has been said to be a test more of exclusion than one of identification.

Nevertheless, mtDNA typing has several advantages over traditional nuclear DNA typing. First, while any given cell contains only one nucleus, that same cell may contain hundreds or thousands of mitochondria from which to conduct analysis. MtDNA, therefore, can be obtained from some sources that nuclear DNA cannot, such as from bone, teeth, or hair shafts. Moreover, mtDNA can be obtained from small amounts of material, from degraded material, or even from dead cells.

MtDNA analysis does have some shortcomings, however. The most important of these is the extreme sensitivity of the material, which renders it particularly susceptible to contamination. The State's expert admitted that all who handle mtDNA must be cognizant of the greater potential for contamination and that in any mtDNA laboratory, the contamination controls must be heightened. The potential for contamination seems to be greatest when the mtDNA is exposed to other organic materials or fluids. Moreover, the available database of mtDNA sequences, to which mtDNA profiles are compared to identify whether a particular profile commonly occurs within the

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<sup>8</sup> (...continued)

criminal case regarding mtDNA. Agent Wilson was admitted as an expert in DNA analysis, and it appears that he has had substantial experience in mtDNA analysis.

<sup>9</sup> As to the actual method of analysis, the North Carolina Court of Appeals recently provided this succinct statement:

Mitochondrial DNA testing is performed by extracting the DNA from the mitochondria. The DNA is then amplified and examined to determine its sequences of A's, G's, T's, and C's. The sequence is then compared to another sequence donated by a known person. If the sequences are identical, the examiner compares the sequence to the available database of mtDNA sequences to determine if he has ever seen that same sequence. The statistic will be based upon the frequency of similar DNA patterns occurring within the database and within each group in the database. The final result simply either excludes the tested individual as the sample donor or confirms that such individual is within a certain percentage of the population which could have donated the sample.

State v. Underwood, 518 S.E.2d 231, 237 (N.C. Ct. App. 1999).

population, is relatively small when compared to the database compiled for nuclear DNA profiles. Although the smaller size of the database is due to the relative infancy of forensic mtDNA analysis, the ability to identify common types of mtDNA profiles in the general population is certainly more restricted than that of traditional nuclear DNA analysis.

*THE NEED FOR A McDANIEL HEARING ON THE RELIABILITY  
OF MtDNA ANALYSIS*

In Tennessee, the admissibility of expert testimony as to scientific or technical evidence is governed by Tennessee Rules of Evidence 702 and 703. *See, e.g., State v. Coley*, \_\_\_ S.W.3d \_\_\_, \_\_\_ (Tenn. 2000); *State v. Begley*, 956 S.W.2d 471, 475 (Tenn. 1997). In *McDaniel v. CSX Transportation, Inc.*, 955 S.W.2d 257 (Tenn. 1997), this Court outlined the procedures by which trial courts were to determine the admissibility of scientific evidence under these rules. As we have recently stated in *Coley*, these procedures are as follows:

First, the evidence must be relevant to a fact at issue in the case. Second, the expert must be qualified by specialized knowledge, skill, experience, training, or education in the field of expertise, and the testimony in question must substantially assist the trier of fact to understand the evidence or determine a fact in issue. Finally, when the expert witness offers an opinion or states an inference, the underlying facts or data upon which the expert relied must be trustworthy.

\_\_\_ S.W.3d at \_\_\_ (citations omitted); *see also Begley*, 956 S.W.2d at 475.

As is clear from the opinion itself, the principal purpose of holding a McDaniel hearing is to determine whether the proffered scientific or technical evidence is trustworthy and reliable. Indeed, all of the factors listed by McDaniel to evaluate the proffered evidence are used only for the purpose of determining the reliability of the scientific evidence. *Id.* at 265 (stating that “[a] Tennessee trial court may consider [the following non-exclusive list of factors] in determining reliability”). *Cf. Coley*, \_\_\_ S.W.3d at \_\_\_ (citing McDaniel as the test for establishing the reliability of proffered expert testimony). As such, where the general reliability of scientific evidence is not contested or is not otherwise an issue in the case, the need to hold a McDaniel hearing does not arise.

With respect to the admission of scientific or technical evidence relating to DNA analysis, Tennessee is among a handful of states that have addressed this issue by statute.<sup>10</sup> In 1991, the

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<sup>10</sup> There are presently six other states which have DNA statutes similar to Tennessee’s statute. *See* Conn. Gen. Stat. Ann. § 54-86k(a) (West Supp. 1999) (“In any criminal proceeding, DNA (deoxyribonucleic acid) testing shall be deemed to be a reliable scientific technique and the evidence of a DNA profile comparison may be admitted to prove or disprove the identity of any person.”); Del. Code Ann. tit. 29, § 4713(a) (Supp. 1999) (“In any criminal proceeding, DNA (deoxyribonucleic acid) testing shall be deemed to be a reliable scientific technique, and the evidence of a DNA profile comparison shall be admitted to prove or disprove the identity of any person.”); Ind. Code Ann. § 35-37-4-13(b) (1998) (“In a criminal trial or hearing, the results of forensic DNA analysis are admissible in evidence without antecedent

(continued ...)

General Assembly enacted a statute to admit DNA evidence “without antecedent expert testimony that DNA analysis provides a trustworthy and reliable method of identifying characteristics in an individual’s genetic material.” Tenn. Code Ann. § 24-7-117(b) (1994). This statute conditions full admission of DNA analysis into evidence, however, “upon a showing that the offered testimony meets the standards of admissibility set forth in the Tennessee Rules of Evidence.” *Id.*

Neither party disputes that mtDNA analysis falls within the definition of “DNA analysis” as provided in the statute.<sup>11</sup> Rather, the appellant asserts that section 24-7-117 does not eliminate the need for a *McDaniel* hearing on the reliability of mtDNA analysis. According to the appellant, nothing in section 24-7-117 alleviates the “significant” burden of trial courts to “analyze and to screen novel scientific evidence.” While we agree with the appellant that trial courts have a significant burden to analyze and screen novel scientific evidence, we disagree that this fact compels a *McDaniel* hearing with respect to this type of evidence.

As this Court stated in *Begley* with regard to PCR DNA analysis,

Because the DNA evidence at issue here is governed by [Tennessee Code Annotated section] 24-7-117, the evidence is statutorily regarded as trustworthy and reliable. Tennessee Code Annotated [section] 24-7-117 exempts DNA evidence from the trial court determination under Rule 703 of whether it provides a trustworthy and reliable method of identifying characteristics in an individual’s genetic material. Consequently, a judicial determination of the scientific reliability of the evidence is unnecessary.

956 S.W.2d at 477. Because the very purpose of a *McDaniel* hearing is to determine the *reliability* of scientific or technical evidence, it would make little sense for this Court to require such a hearing for evidence that is statutorily admissible without antecedent testimony that it is a reliable method of identification. While such DNA evidence must satisfy the other admission standards of the Rules

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<sup>10</sup> (...continued)

expert testimony that forensic DNA analysis provides a trustworthy and reliable method of identifying characteristics in an individual’s genetic material.”); Minn. Stat. Ann. § 634.25 (West Supp. 1999) (“In a civil or criminal trial or hearing, the results of DNA analysis, as defined in section 299C.155, are admissible in evidence without antecedent expert testimony that DNA analysis provides a trustworthy and reliable method of identifying characteristics in an individual’s genetic material upon a showing that the offered testimony meets the standards for admissibility set forth in the Rules of Evidence.”); N.D. Cent. Code § 31-13-02 (Supp. 1999) (“In any court proceeding, DNA testing is deemed to be a reliable scientific technique, and the evidence of a DNA profile comparison must be admitted as prima facie evidence to prove or disprove the identity of any person.”); Va. Code Ann. § 19.2-270.5 (Michie Supp. 1999) (“In any criminal proceeding, DNA (deoxyribonucleic acid) testing shall be deemed to be a reliable scientific technique and the evidence of a DNA profile comparison may be admitted to prove or disprove the identity of any person.”). Several of these statutes are less broad than Tennessee’s statute, which applies to civil cases in addition to criminal cases.

<sup>11</sup> Section 21-7-117 defines “DNA analysis” broadly as “the process through which deoxyribonucleic acid (DNA) in a human biological specimen is analyzed and compared with DNA from another biological specimen for identification purposes.” We agree with both parties that the method of mtDNA analysis falls within the statutory definition of “DNA analysis.”

before it is properly considered by the jury, the statute clearly exempts such evidence from a judicial determination of its general reliability as a method of proving identification.

Based upon our own examination of the record, we conclude that the trial court did not err in admitting evidence of mtDNA analysis without first holding a pretrial hearing to establish its general reliability as a method of identification. The evidence of mtDNA analysis was clearly relevant as the evidence tended to make more probable the fact that the appellant was the perpetrator of the crime. See Tenn. R. Evid. 401. In addition, the witness proffering the evidence was qualified and accepted by the court as an expert with “knowledge, skill, experience, training, or education” in this field, see Tenn. R. Evid. 702, and the expert’s specialized knowledge no doubt substantially assisted the jury in determining the identity of the perpetrator, id.; see also Begley, 956 S.W.2d at 477. Accordingly, we find that the evidence of mtDNA analysis met the general standards under the Rules of Evidence concerning the admission of scientific or technical evidence. Furthermore, because the mtDNA evidence is statutorily deemed to be reliable, the trial court did not err in failing to hold a McDaniel hearing. Cf. Begley, 956 S.W.2d at 477.

The appellant responds by asserting that section 24-7-117 itself conditions admissibility of the DNA evidence upon a showing that the evidence meets the standards of admissibility set forth in the Rules of Evidence. He then argues that because Rule 703 and McDaniel both require the trial court to make a threshold finding of reliability before admitting the evidence, our interpretation of the statute “relieve[s] the State of its obligation to establish the reliability of the methodology” of mtDNA evidence under those two authorities. More specifically, the appellant claims that before such evidence was admissible under Rule 702 and McDaniel, the State should have established the following: (1) that the procedures for mtDNA analysis had been tested; (2) that the evidence had been subjected to peer review or publication; (3) whether the potential rate of error was known; (4) that the mitochondrial technique of DNA evidence was generally accepted in the scientific community; and (5) that FBI Agent Mark Wilson had conducted any research in this field independent of litigation.

Although the appellant is correct that trial courts generally have a duty to ensure that scientific evidence is reliable, he apparently overlooks the plain language of section 24-7-117, which clearly dispenses with the need to establish that the analysis “provides a trustworthy and reliable method of identifying characteristics in an individual’s genetic material.” As such, the statute is more properly read to mean that evidence of DNA analysis is admissible “upon a showing that the evidence *otherwise* meets the standards of admissibility set forth in the Tennessee Rules of Evidence.” We decline to interpret section 24-7-117 in the manner suggested by the appellant, as this result would defeat the obvious purpose of the statute in minimizing litigation concerning the general reliability of DNA analysis as a method of proving identification.

Of course, to say that the results of DNA analysis are generally admissible without expert testimony that the results provide a reliable method of identification is not to say that the appellant

could not challenge the particular tests at issue in this case.<sup>12</sup> As section 24-7-117(c) indicates, the statute was carefully drafted to ensure that it would not be “construed as prohibiting any party in a civil or criminal trial from offering proof that DNA analysis does not provide a trustworthy and reliable method of identifying characteristics in an individual’s genetic material.” Moreover, the statute is clear that it does not “prohibit a party from cross-examining the other party’s expert as to the lack of trustworthiness and reliability of such analysis.” Because the statute does not preclude questions as to the particular reliability of the mtDNA evidence in any given case, we hold that the trial court did not abuse its discretion in failing to hold a McDaniel hearing to determine the reliability of mtDNA analysis as a method of identification.

### CHAIN OF CUSTODY OF THE HAIR SAMPLES

Although we hold that the trial court did not err in admitting evidence of mtDNA analysis without first holding a McDaniel hearing to establish the general reliability of the type of evidence, the appellant goes further to assert that the trial court committed reversible error in admitting the particular mtDNA evidence in this case. He maintains that because the State failed to establish a proper chain of custody for the hairs taken from the victim, the particular evidence in this case was not properly authenticated under Tennessee Rule of Evidence 901(a). We agree.

As required by Rule of Evidence 901(a), it is “well-established that as a condition precedent to the introduction of tangible evidence, a witness must be able to identify the evidence or establish an unbroken chain of custody.” State v. Holbrooks, 983 S.W.2d 697, 701 (Tenn. Crim. App. 1998); see also, e.g., State v. Cameron, 909 S.W.2d 836, 850 (Tenn. Crim. App. 1995). The purpose of the chain of custody requirement is “to demonstrate that there has been no tampering, loss, substitution, or mistake with respect to the evidence.” See State v. Braden, 867 S.W.2d 750, 759 (Tenn. Crim. App. 1993). The identity of tangible evidence, however, need not be proven beyond all possibility of doubt, see State v. Holloman, 835 S.W.2d 42, 46 (Tenn. Crim. App. 1992), and the State is not required to establish facts which exclude every possibility of tampering, see State v. Ferguson, 741 S.W.2d 125, 127 (Tenn. Crim. App. 1987). The evidence may be admitted when the circumstances surrounding the evidence reasonably establish the identity of the evidence and its integrity. Holloman, 835 S.W.2d at 46. Absent sufficient proof of the chain of custody, however, the “evidence should not be admitted . . . unless both identity and integrity can be demonstrated by other appropriate means.” Neil P. Cohen, et al., Tennessee Law of Evidence § 901.12, at 624 (3d ed. 1995).

The appellant maintains that the State failed to properly establish the chain of custody of the hairs removed from the victim because the State could introduce no proof of how the hairs were mounted on the glass slides for examination. At trial, the State introduced evidence establishing most of the links in the chain of custody. For example, the nurse practitioner who examined the

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<sup>12</sup> In fact, the appellant took full advantage of this opportunity—to the extent he was able to do so without expert assistance—by extensive questioning the state’s expert about the reliability of the particular mtDNA tests in this case.

victim testified that she placed all of these hairs collected from the victim into a single envelope. A police detective, Steve Kleek, then testified that he took the victim's rape kit with the hairs to the Tennessee Bureau of Investigation for analysis and that he later regained custody of the hairs from the TBI.

Detective Kleek also testified that he was responsible for sending the hairs to the FBI for DNA analysis, and prior to sending the hairs to the FBI, the detective noted that only two hairs were contained in the envelope. When the FBI returned the hairs to detective Kleek, however, he noted that two hairs were now mounted on glass slides for use in a microscope. The detective testified that he then sent the mounted hairs for analysis to LabCorp, who confirmed that the hairs were already mounted on slides when they were received.

We agree with the appellant that the trial court erred in finding that the hair samples were properly authenticated. The hairs were not identified by a witness with knowledge that the mounted hair samples were the same hairs as the ones originally taken from the victim. Further, we can find no evidence whatsoever to show how the hairs came to be mounted on the slides. We also can find no evidence to show who mounted the hairs on the slides or whether the hairs were mounted in a manner sufficiently free of contamination or alteration.<sup>13</sup> Although the hairs were apparently mounted on glass slides by someone with the FBI, no one was able to establish this important "link" in the chain of custody. Without this knowledge, it is impossible to know whether anyone tampered with the evidence, or whether anyone had the opportunity to "confuse, misplace, damage, substitute, lose, [or] replace" the hairs at issue. *Cf. Cohen, et al., Tennessee Law of Evidence* at 623-24. Because reasonable people cannot disagree that the State failed to establish this important "link" in the chain, we find that the trial court erred in admitting the analysis of the hair samples without reasonably establishing their identity and integrity. *See Tenn. R. Evid. 901(a)*.

We note that while the Court of Criminal Appeals in this case also found a "missing link" in the chain," the intermediate court found this error to be harmless. Although our holding that the trial court erred in admitting the mtDNA evidence would normally require this Court to examine whether the error affirmatively appears to have affected the outcome of the trial, *see Tenn. R. Crim. P. 52(a)*, we decline to reach any determination on this issue at this time because we have reversed the appellant's convictions and sentences on other grounds. We emphasize that before the evidence is admitted at any retrial, the State must establish a proper chain of custody.

## CONCLUSION

In summary, we hold that the appellant was improperly denied expert assistance in the field of DNA analysis. Because we are unable to say that this error was harmless beyond a reasonable doubt, we reverse the appellant's convictions and sentences. We also hold that the appellant was not

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<sup>13</sup> Apparently, this link in the chain of custody is especially important in cases where mtDNA is used as evidence. According to evidence in the record, mtDNA samples are hypersensitive to contamination, and the particular methods of storing and mounting the hairs could very well compromise the test results.

entitled to a pretrial hearing on the general reliability of mtDNA analysis as a method of identification because Tennessee Code Annotated section 24-7-117 exempts this type of evidence from a general determination of reliability under McDaniel v. CSX Transportation, Inc., 955 S.W.2d 257 (Tenn. 1997). Finally, we hold that the trial court erred in finding that the State properly established a chain of custody for the hairs taken from the victim. The judgment of the Court of Criminal Appeals is affirmed in part and reversed in part, and this case is remanded to the Davidson County Criminal Court for a new trial on both counts of the indictment.

It appearing from the record that the appellant is indigent, costs of this appeal are assessed to the State of Tennessee.

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WILLIAM M. BARKER, JUSTICE